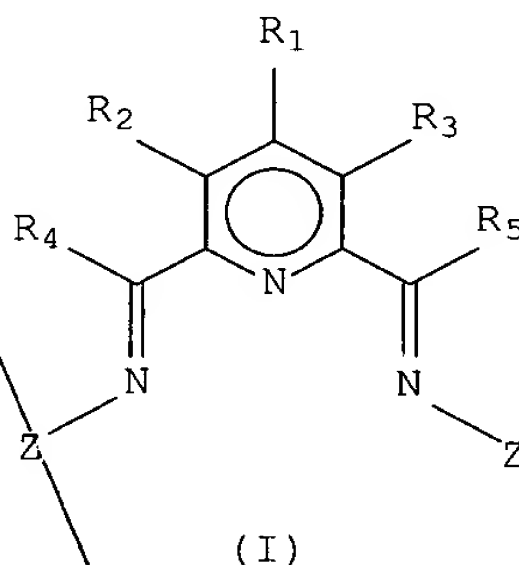


WE CLAIM:

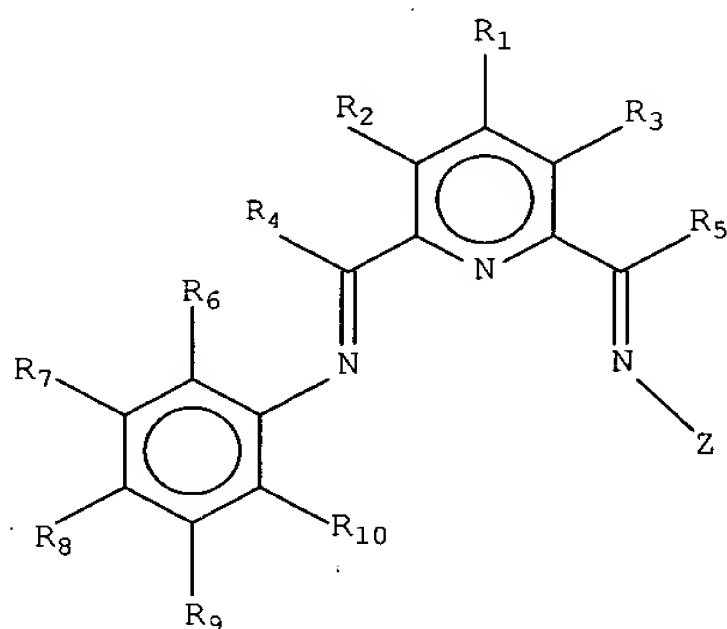
1. A process for production of higher linear alpha olefins and/or alkyl-branched alpha olefins, which comprises the co-oligomerisation of one or more alpha olefins with ethylene in the presence of a metal catalyst system employing one or more bis-aryliminepyridine  $\text{MX}_a$  complexes and/or one or more [bis-aryliminepyridine  $\text{MY}_p \cdot \text{L}_b^+ ] [\text{NC}^-]_q$  complexes, said bis-aryliminepyridine complexes comprising a ligand of the formula,



wherein M is a metal atom selected from Fe or Co; a is 2 or 3; X is halide, optionally substituted hydrocarbyl, alkoxide, amide, or hydride; Y is a ligand which may insert an olefin;  $\text{NC}^-$  is a non-coordinating anion; p+q is 2 or 3, matching the formal oxidation of said metal atom; L is a neutral Lewis donor molecule; b = 0, 1, or 2;  $\text{R}_1$ - $\text{R}_5$  are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of  $\text{R}_1$ - $\text{R}_3$  vicinal to one another taken together may form a ring; each Z, which may be identical or different, is an optionally substituted aromatic hydrocarbon ring; an optionally substituted polyaromatic

hydrocarbon moiety; an optionally substituted heterohydrocarbyl moiety; or an optionally substituted aromatic hydrocarbon ring in combination with a metal, said optionally substituted aromatic hydrocarbon ring being  $\pi$ -co-ordinated to the metal; and said process is carried out at an ethylene pressure of less than 2.5 MPa.

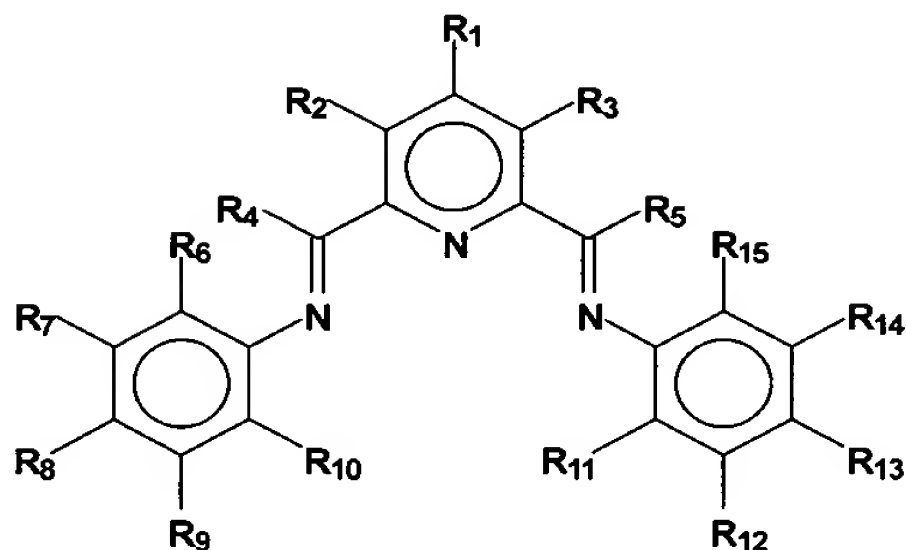
2. The process of Claim 1 wherein said ligand is of the formula,



(II)

wherein R<sub>1</sub>-R<sub>10</sub> are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R<sub>1</sub>-R<sub>3</sub>, R<sub>6</sub>-R<sub>10</sub> vicinal to one another taken together may form a ring; R<sub>6</sub> may be taken together with R<sub>4</sub> to form a ring; R<sub>10</sub> may be taken together with R<sub>4</sub> to form a ring; Z is an optionally substituted aromatic hydrocarbon ring; an optionally substituted polyaromatic hydrocarbon moiety; an optionally substituted heterohydrocarbyl moiety; or an optionally substituted aromatic hydrocarbon ring in combination with a metal, said optionally substituted aromatic hydrocarbon ring being  $\pi$ -co-ordinated to the metal.

3. The process of Claim 1 wherein said ligand is of the formula,



(III)

wherein R<sub>1</sub>-R<sub>5</sub>, R<sub>7</sub>-R<sub>9</sub> and R<sub>12</sub>-R<sub>14</sub> are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R<sub>1</sub>-R<sub>3</sub>, R<sub>7</sub>-R<sub>9</sub> and R<sub>12</sub>-R<sub>14</sub> vicinal to one another taken together may form a ring; R<sub>6</sub> is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R<sub>7</sub> or R<sub>4</sub> to form a ring; R<sub>10</sub> is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R<sub>9</sub> or R<sub>4</sub> to form a ring; R<sub>11</sub> is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R<sub>5</sub> or R<sub>12</sub> to form a ring; and R<sub>15</sub> is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R<sub>5</sub> or R<sub>14</sub> to form a ring.

4. The process of Claim 3 wherein R<sub>1</sub>-R<sub>5</sub>, R<sub>7</sub>-R<sub>9</sub> and R<sub>12</sub>-R<sub>14</sub> are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or

any two of R<sub>1</sub>-R<sub>3</sub>, R<sub>7</sub>-R<sub>9</sub> and R<sub>12</sub>-R<sub>14</sub> vicinal to one another taken together may form a ring; R<sub>6</sub> is a primary carbon group, a secondary carbon group or a tertiary carbon group; and provided that:

when R<sub>6</sub> is a primary carbon group none, one or two of R<sub>10</sub>, R<sub>11</sub> and R<sub>15</sub> are primary carbon groups, and the remainder of R<sub>10</sub>, R<sub>11</sub> and R<sub>15</sub> are hydrogen;

when R<sub>6</sub> is a secondary carbon group none or one of R<sub>10</sub>, R<sub>11</sub> and R<sub>15</sub> is a primary carbon group or a secondary carbon group and the remainder of R<sub>10</sub>, R<sub>11</sub> and R<sub>15</sub> are hydrogen;

when R<sub>6</sub> is a tertiary carbon group all of R<sub>10</sub>, R<sub>11</sub> and R<sub>15</sub> are hydrogen; and

any two of R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub>, R<sub>14</sub> and R<sub>15</sub> vicinal to one another, taken together may form a ring.

5. The process of Claim 3 wherein R<sub>1</sub>-R<sub>5</sub>, R<sub>7</sub>-R<sub>9</sub> and R<sub>12</sub>-R<sub>14</sub> are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R<sub>1</sub>-R<sub>3</sub>, R<sub>7</sub>-R<sub>9</sub> and R<sub>12</sub>-R<sub>14</sub> vicinal to one another taken together may form a ring; R<sub>6</sub> is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R<sub>7</sub> or R<sub>4</sub> to form a ring; R<sub>10</sub> is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R<sub>9</sub> or R<sub>4</sub>



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13. A composition comprising linear alpha olefins and/or alkyl branched alpha olefins produced by the process of Claim 1.

14. The composition of Claim 13 wherein said alkyl-branched alpha olefins are methyl- and/or ethyl-branched alpha olefins.

15. A composition comprising linear alpha olefins and/or alkyl-branched alpha olefins, wherein said composition contains greater than 5 % wt. alkyl-branched alpha olefins based on the total weight of linear alpha olefins and alkyl-branched alpha olefins in the product composition.

16. The composition of Claim 15 wherein said allyl-branched alpha olefins are methyl- and/or ethyl branched alpha olefins.

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